RAINVISION

Results of WP4 – On Road Test

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European Commission
Mobility & Transport

Purpose of the WP4

EVALUATION OF WET NIGHT MARKINGS ON DRIVER BEHAVIOURS (SPEED) AND ACCIDENTS

Stage 1 – Site Identification & Data Collection

Initial aim identification of 20 high risk sites suitable for application of high performance materials

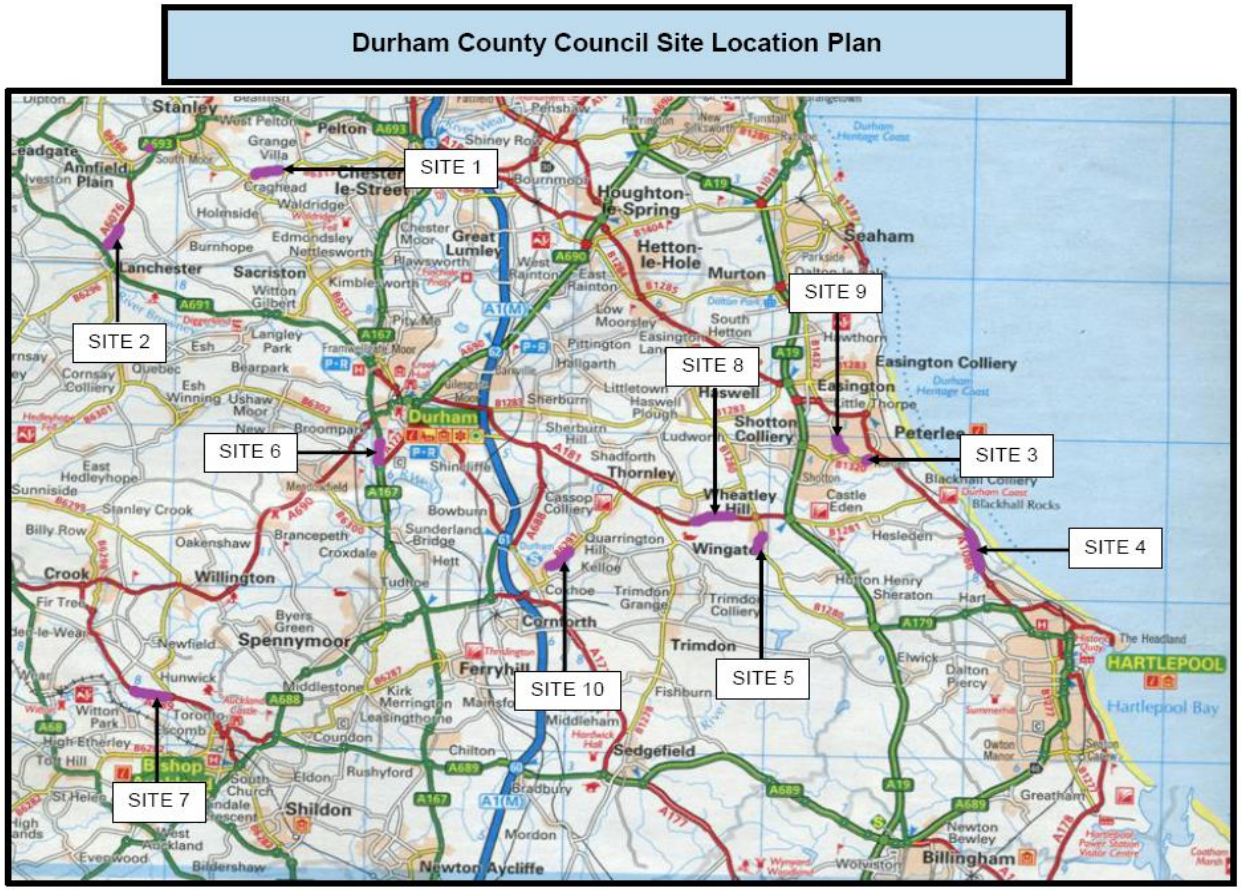
On going programme of 10 sites in one highway authority area – Durham Council

Assessment of accident statistics across Durham preceding 12 months – identified the range of sites most suited to the project/

Sites varied by:

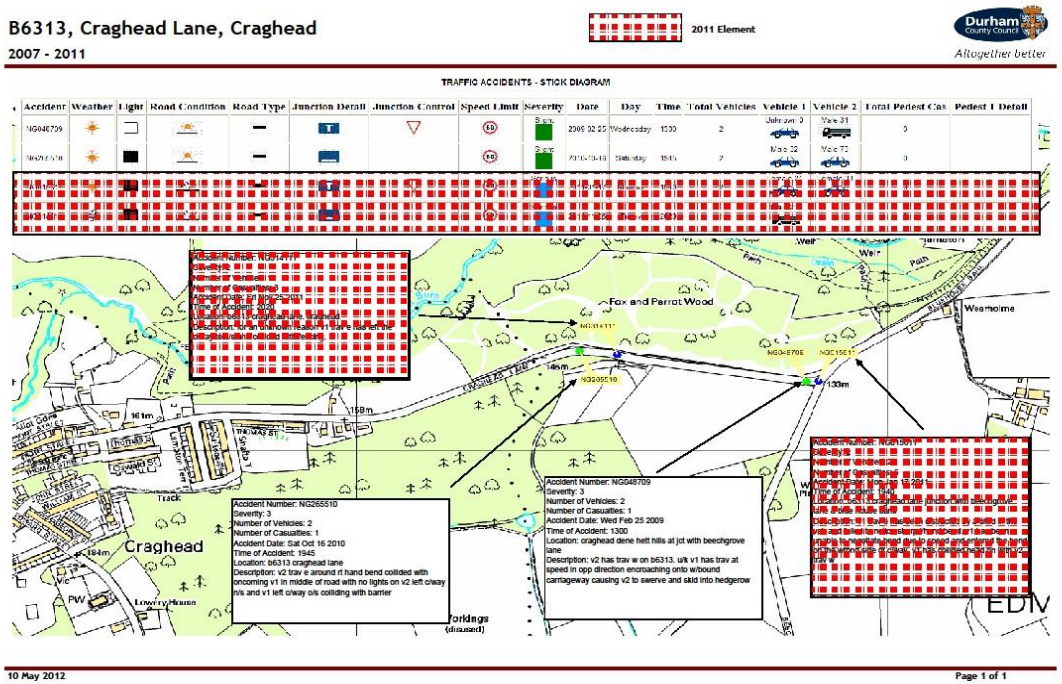
- Type of location i.e. Rural, urban, semi urban, semi rural
- Locational topography i.e flat, incline
- Configuration i.e. Straight and with bends

Stage 1 – Site Identification & Data Collection



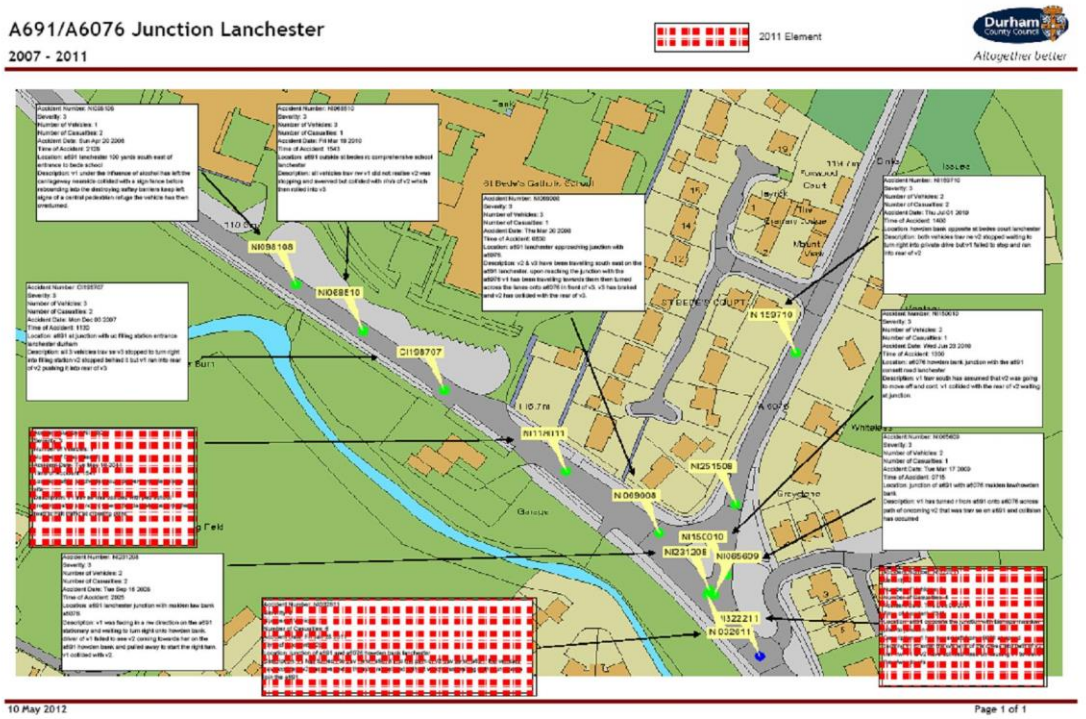
Stage 1 – Site Identification & Data Collection

Description: Rural site, 60mph speed limit. Slight downhill west to east.



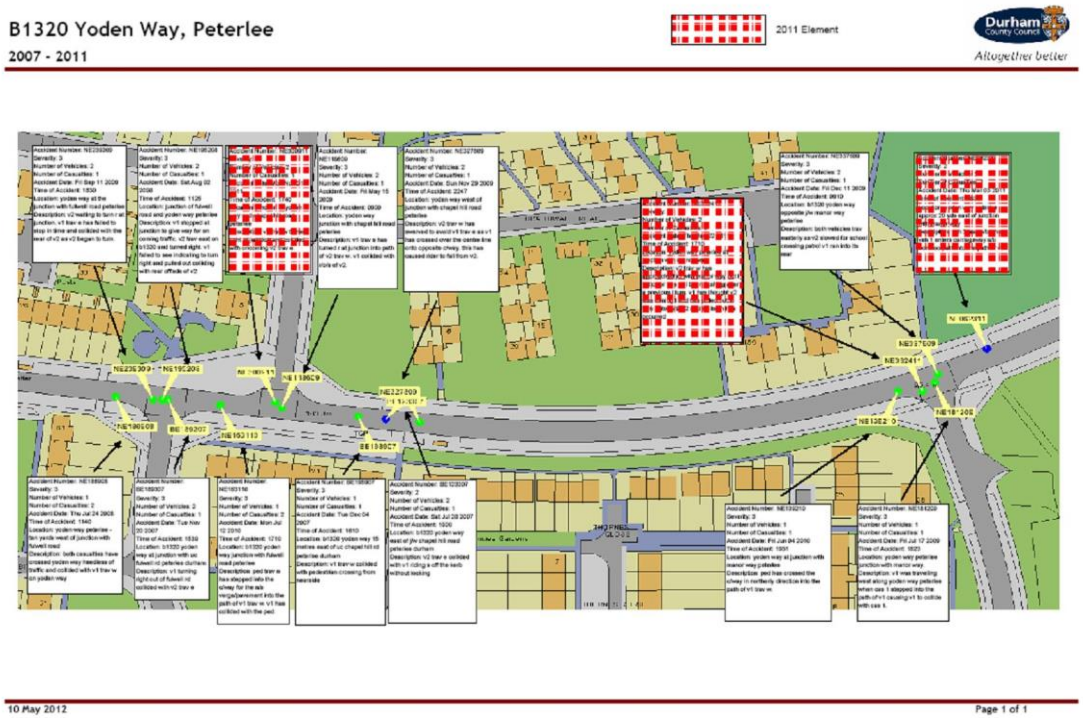
Stage 1 – Site Identification & Data Collection

Description: Semi-rural site,30mph speed limit, with gentle slope north to south.



Stage 1 – Site Identification & Data Collection

Description: Urban site, 30mph speed limit, with gentle downhill slope north to south, adjacent to school.



Stage 1 – Site Identification & Data Collection

Site No.	Speed limit	Group	Road type	Location type	Street Lighting
1	60	B	Straight	Rural	N
2	30	A	Semi-straight	Urban	Y
3	30	A	Straight	Urban	Y
4	60	B	Straight	Semi-urban	Y
5	30	A	Slight bend	Urban	Y
6	60	B	Semi-straight	Semi-urban	Y
7	60	B	Straight	Semi-rural	N
8	60	B	Straight	Semi-rural	Y
9	30	A	Slight bend	Urban	Y
10	60	B	Slight bend	Semi-rural	N

The ten sites were categorised into 2 groups (A and B) based on the speed limit, contour / shape of road and location of site. These groups were used in determining the speed difference analysis.

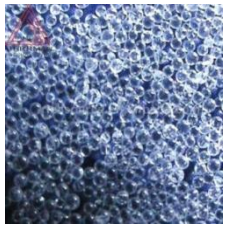
Driver speed was monitored at all 10 sites for a four week period using a pneumatic tube monitor.
The raw data sets, were analysed and assessed with average vehicle speeds being calculated on an hourly, daily and weekly basis.

Stage 2 – On Road Test

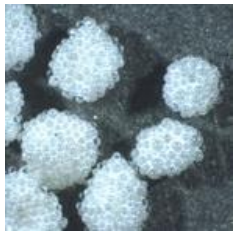
The principles of Wet Night Visibility Road Markings

"*The primary objective of a wet night visibility road marking is for it to perform efficiently as regards retro-reflectivity in conditions of wet and rain*"

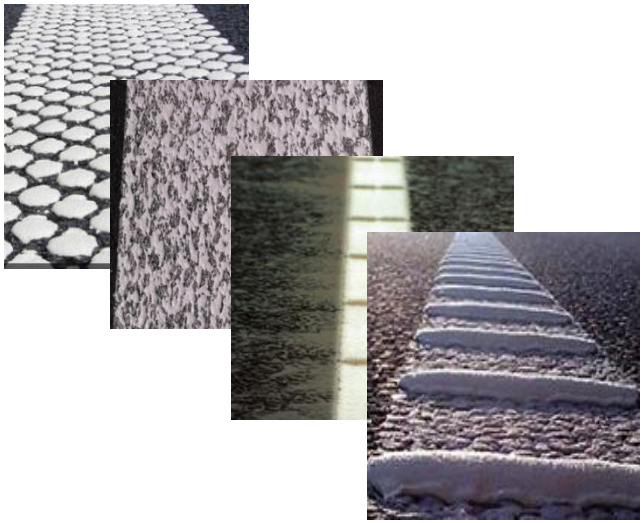
High index beads of diameter ≥ 1.0mm



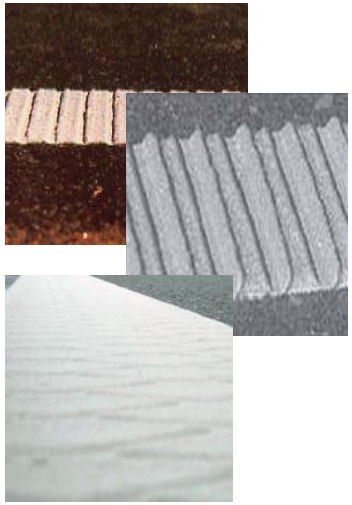
Agglomerate beads



Profiled Markings



Embossed Markings



Stage 2 – On Road Test

Installation of Project Specific Wet Night Visibility Product

- August and September of 2012

Installation of Wet night visibility performance product on all 10 sites

The longitudinal lines on the sites were laid with the Line 'n' Dot road marking system

Designed for producing structured markings via extruder application

EN1871 Compliant

- Performance Characteristics:
  Q_d - Class Q4 >160mcd/$m_2$lx
  R_L - Class R4 > 200mcd/$m_2$lx(Dry)
  RL - Class RW4 > 75 mcd/$m_2$lx(Wet)

Stage 2 – On Road Test

Speed Monitoring:
Across 10 sites using a 3M Driver Feedback Sign DFS 700, a temporary vehicle activated sign which detects and displays, in real time, the speeds of vehicles driving into the radar beam.

To ensure that a best and truest reflection of any change in driver behaviour was obtained the face of the speed detection equipment was masked with black plastic sheet.

Data collected using 8 Cameras rotated through sites monitoring speed on each site from different directions

Stage 3 – Statistical Analysis: Accidents & Speed

Accident Data Investigation:

- Data collated in 2 time frames:

Jan 2012 – Dec 2012
Jan 2013 – Dec 2013

Accident information compiled by Durham County Council
Incident Causation Reports compiled by Durham Police

Underlying cause of the incident linked to the attending police officer filling out the most likely contributing accident causation factor(s) according to accident causation grid codes.

Stage 3 – Statistical Analysis: Accidents & Speed

In depth analysis through evaluation of Police Reports

Causation

- Slippery road (weather)
- Failure to look properly
- Impaired by alcohol
- Failure to judge other persons path or speed
- Panic Inexperienced

Condition

- Light Dry
- Dark icy
- Dark Snow
- Dark Dry
- Light Wet

Conclusion:

NO LINK BETWEEN MARKINGS & RECORDED ACCIDENTS

Stage 3 – Statistical Analysis: Accidents & Speed

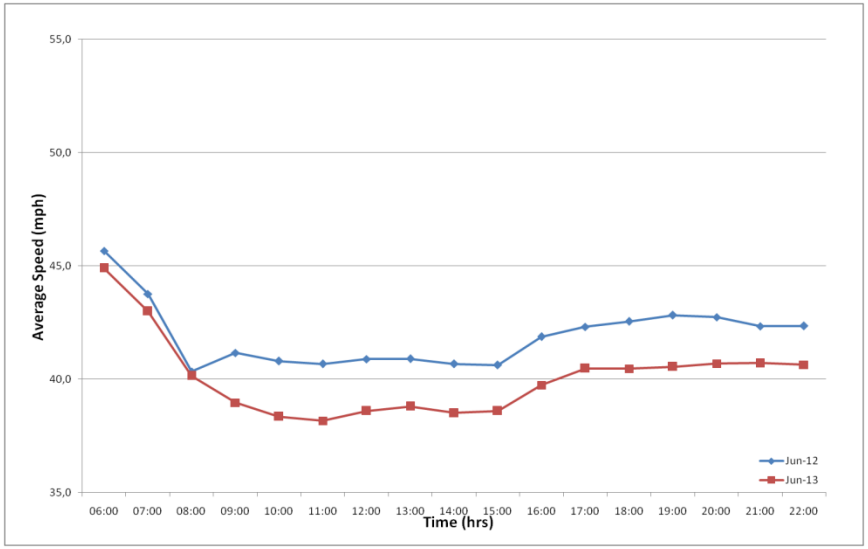
Weather Station Data Analysis:

- Data obtained from Durham University Geography Department:

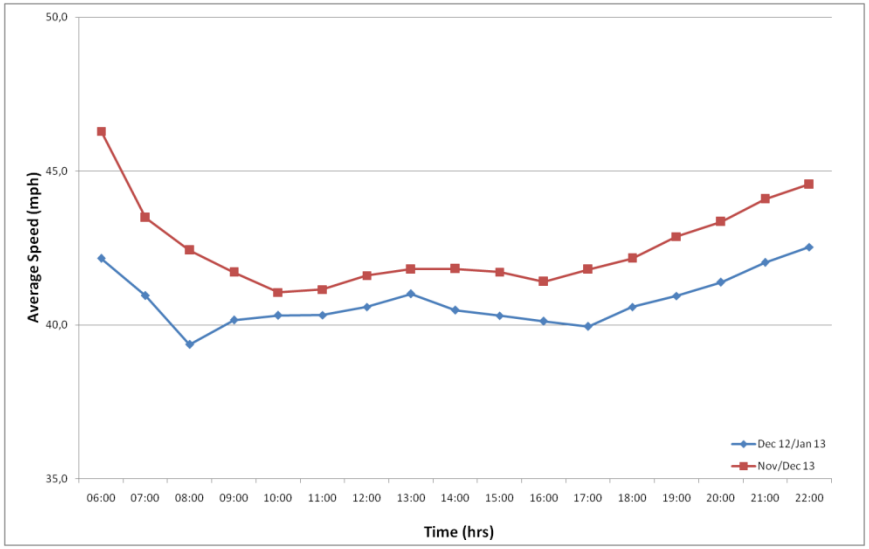
Site No.	Site Search Address	**Straight Line Distance** : Weather Station – Site (miles)
1	Craghead Lane, Craghead	6.7
2	Howden Bank, Lanchester	7.7
3	Yoden Way, Peterlee	10.4
4	Coast Road, Blackhall	13.4
5	Front Street, Wingate	8.8
6	Cock o' the North, Durham	0.9
7	Addison Road, Bishop Auckland	7.9
8	A181, Wheatley Hill	7.0
9	Essington Way, Peterlee	9.8
10	B6291, Quarrington Hill	4.9

Stage 3 – Statistical Analysis: Accidents & Speed

Speed Data Analysis:



Ave. Speed vs Time All sites
June/July 2013 – June/July 2013



Ave. Speed vs Time All sites
Dec 12/Jan13 – Nov/Dec13

Stage 4 – Conclusions (& Recommendations)

- Enhanced retro reflective markings do not lead to increased vehicle speeds
- Performance of markings likely to lead to lower accident risk

Caveat

- Survey size is small and therefore a larger survey should be undertaken to compensate for bias created by variations in weather, climate, apparatus and traffic.
- Additional research may also consider looking at vehicle lateral location.

Thank you

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